

Jussi Leinonen

CONTACT INFORMATION	Climate Physics Earth Science Jet Propulsion Laboratory 4800 Oak Grove Dr, MS 233-300 Pasadena, CA 91109, USA	Phone: 1-818-354-2788 E-mail: jussi.s.leinonen@jpl.nasa.gov
RESEARCH INTERESTS	Microphysics and remote sensing of rain, snowfall and clouds; precipitation radar; electromagnetic scattering; probabilistic data analysis.	
EDUCATION	Aalto University , Espoo, Finland <i>Doctor of Science (Tech.)</i> , Physics Advisors: Prof. Risto Nieminen (Aalto University) and Dr. Timo Nousiainen (University of Helsinki) Helsinki University of Technology , Espoo, Finland <i>Master of Science (Tech.)</i> , Physics (major), Space Technology (minor)	May 2009 – June 2013 September 2002 – March 2007
RESEARCH EXPERIENCE	Jet Propulsion Laboratory, California Institute of Technology , Pasadena, California, USA <i>Postdoctoral Scholar</i> Research on the information content of cloud and precipitation remote sensing measurements. Finnish Meteorological Institute , Helsinki, Finland <i>Graduate researcher</i> Research on microphysics and radar remote sensing of hydrometeors, snow in particular. Finnish Institute of Marine Research , Helsinki, Finland <i>Civilian service</i> Data analysis and operational programming related to sea level and wave height measurements and forecasts. Finnish Meteorological Institute , Helsinki, Finland <i>Research trainee</i> Analysis of the Huygens pressure measurements from Titan, including reconstruction of the temperature profile independently of temperature measurements. Low Temperature Laboratory , Helsinki University of Technology, Espoo, Finland <i>Research assistant</i> Design and use of computer software for the analysis of experiments on rotating Helium-3 superfluid.	March 2014 – present November 2008 – March 2014 January 2008 – October 2008 May 2005 – June 2007
PROFESSIONAL ACTIVITIES	Reviewed papers for <i>Atmospheric Measurement Techniques</i> , <i>Geophysical Research Letters</i> , <i>IET Microwaves, Antennas & Propagation</i> , <i>Journal of Applied Meteorology and Climatology</i> , <i>Journal of Atmospheric and Oceanic Technology</i> , <i>Journal of Geophysical Research: Atmospheres</i> , <i>Journal of Hydrometeorology</i> and <i>Quarterly Journal of the Royal Meteorological Society</i> . Author of the <i>pytmatrix</i> and <i>pymiecoated</i> computational scattering packages. Contributor to the <i>ADDA</i> discrete dipole approximation software.	
HONORS AND AWARDS	Best student poster, ERAD 2012, Toulouse, France, 2012. Finnish Meteorological Institute Earth Observation award for scientific productivity, 2011. Best student poster, 4th International Planetary Probe Workshop, Pasadena, CA, USA, 2006.	

Publications

PEER REVIEWED ARTICLES

- [15] J. Leinonen, M. Lebsack, S. Tanelli, K. Suzuki, H. Yashiro, and Y. Miyamoto. Performance assessment of a triple-frequency spaceborne cloud–precipitation radar concept using a global cloud-resolving model. *Atmospheric Measurement Techniques*, 8:3493–3517, 2015. doi:10.5194/amt-8-3493-2015.
- [14] J. Leinonen and W. Szyrmer. Radar signatures of snowflake riming: a modeling study. *Earth and Space Science*, 2, 2015. doi:10.1002/2015EA000102.
- [13] S. Kneifel, A. von Lerber, J. Tiira, D. Moisseev, P. Kollias, and J. Leinonen. Observed relations between snowfall microphysics and triple-frequency radar measurements. *Journal of Geophysical Research*, 120:6034–6055, 2015. doi:10.1002/2015JD023156.
- [12] J. Leinonen and D. Moisseev. What do triple-frequency radar signatures reveal about aggregate snowflakes? *Journal of Geophysical Research*, 120:223–239, 2015. doi:10.1002/2014JD022072.
- [11] A. von Lerber, D. Moisseev, J. Leinonen, J. Koistinen, and M. Hallikainen. Modeling attenuation of a low melting layer with optimized model parameters at C-band. *IEEE Transactions on Geoscience and Remote Sensing*, 53:724–727, 2015. doi:10.1109/TGRS.2014.2327148.
- [10] J. Leinonen. High-level interface to T-matrix scattering calculations: architecture, capabilities and limitations. *Optics Express*, 22:1655–1660, 2014. doi:10.1364/OE.22.001655.
- [9] J. Tyynelä, J. Leinonen, D. Moisseev, T. Nousiainen, and A. von Lerber. Modeling radar backscattering from melting snowflakes using spheroids with nonuniform distribution of water. *Journal of Quantitative Spectroscopy and Radiative Transfer*, 133:504–519, 2013. doi:10.1016/j.jqsrt.2013.09.013.
- [8] J. Leinonen, D. Moisseev, and T. Nousiainen. Linking snowflake microstructure to multi-frequency radar observations. *Journal of Geophysical Research*, 118:3259–3270, 2013. doi:10.1002/jgrd.50163.
- [7] J. Tyynelä, J. Leinonen, C. Westbrook, D. Moisseev, and T. Nousiainen. Applicability of the Rayleigh–Gans approximation for scattering by snowflakes at microwave frequencies in vertical incidence. *Journal of Geophysical Research*, 118:1826–1839, 2013. doi:10.1002/jgrd.50167.
- [6] J. Leinonen, S. Kneifel, D. Moisseev, J. Tyynelä, S. Tanelli, and T. Nousiainen. Nonspheroidal behavior in millimeter-wavelength radar observations of snowfall. *Journal of Geophysical Research*, 117(D18205), 2012. doi:10.1029/2012JD017680.
- [5] J. Leinonen, D. Moisseev, M. Leskinen, and W. Petersen. A climatology of disdrometer measurements of rainfall in finland over five years with implications for global radar observations. *Journal of Applied Meteorology and Climatology*, 51:392–404, 2012. doi:10.1175/JAMC-D-11-056.1.
- [4] J. Tyynelä, J. Leinonen, D. Moisseev, and T. Nousiainen. Radar backscattering from snowflakes: comparison of fractal, aggregate and soft-spheroid models. *Journal of Atmospheric and Oceanic Technology*, 28:1365–1372, 2011. doi:10.1175/JTECH-D-11-00004.1.

- [3] J. Leinonen, D. Moisseev, V. Chandrasekar, and J. Koskinen. Mapping radar reflectivity values of snowfall between frequency bands. *IEEE Transactions on Geoscience and Remote Sensing*, 49(8):3047–3058, 2011. doi:10.1109/TGRS.2011.2117432.
- [2] J. Leinonen and K. K. Kahma. Estimating optimal weights for combinations of multiple forecasts. *Geophysica*, 46(1–2):21–32, 2010.
- [1] J. Leinonen, T. Mäkinen, and A.-M. Harri. A method to determine the atmospheric temperature profile from in situ pressure data: Application to Titan. *Planetary and Space Science*, 55(14):2071–2076, 2007. doi:10.1016/j.pss.2007.06.001.

ACADEMIC THESES

- [2] J. Leinonen. *Impact of the microstructure of precipitation and hydrometeors on multi-frequency radar observations*. PhD thesis, Aalto University, 2013.
- [1] J. Leinonen. The atmospheric temperature profile of Titan — a measurement consistency study. Master’s thesis, Helsinki University of Technology, 2007.

TECHNICAL REPORTS

- [4] M. Genzer, A.M. Harri, W. Schmidt, and J. Leinonen. MetNet MMPPM experiment interface document. Technical report, Finnish Meteorological Institute, 2009.
- [3] A. Kangas, J. Leinonen, and H. Boman. Sea level forecasting for Finland’s coast for the year 2007. MERI report series 63, Finnish Institute of Marine Research, 2008.
- [2] A.-M. Harri, J. Leinonen, S. Merikallio, M. Paton, H. Haukka, J. Polkko, V. Linkin, V. Lipatov, K. Pichkadze, A. Polyakov, M. Uspensky, L. Vázquez, H. Guerrero, D. Crisp, R. Haberle, S. Calcutt, C. Wilson, P. Taylor, C. Lange, M. Daly, L. Richter, R. Jaumann, J.-P. Pommereau, F. Forget, P. Lognonne, and J. Zarnecki. MetNet – in situ observational network and orbital platform to investigate the Martian environment. Technical Report 2007:3, Finnish Meteorological Institute, 2007.
- [1] T. Pulkkinen, A.-M. Harri, H. Haukka, J. Leinonen, P. Toivanen, H. Koskinen, M. André, G. Balasis, D. Boscher, I. Dandouras, M. Grande, J. de Keyser, K.-H. Glassmeier, M. Hapgood, R. Horne, N. Ivchenko, O. Santolik, K. Torkar, J. G. Trotignon, and S. Vennerstrøm. Waves and acceleration of relativistic particles (WARP). Technical Report 2007:2, Finnish Meteorological Institute, 2007.

INVITED TALKS

- [1] J. Leinonen. Inferring atmospheric vertical profiles from observations and vehicle responses. In *Summer course: The Exploration of Mars*. Complutense University, Madrid, Spain, 2009.

CONFERENCE PROCEEDINGS ARTICLES

- [3] J. Leinonen, V. Chandrasekar, and D. Moisseev. A Bayesian algorithm for tangential deconvolution of weather radar images. In *ERAD 2012, Toulouse, France*, 2012. Poster presentation.

- [2] A. von Lerber, D. Moisseev, J. Leinonen, J. Tyynelä, V. Chandrasekar, and M. Hallikainen. Modeling melting layer radar observations at GPM frequencies; comparison to measurements. In *International Geoscience & Remote Sensing Symposium 2011, Vancouver, Canada*, 2011. Poster presentation. doi:10.1109/IGARSS.2011.6049721.
- [1] J. Leinonen and D. Moisseev. Snowfall characterization with combined ground and space radar. In *ERAD 2010, Sibiu, Romania*, 2010. Oral presentation given by J. Leinonen.

SELECTED CONFERENCE PRESENTATIONS AND POSTERS

- [22] J. Leinonen, M. D. Lebsack, and K. Suzuki. Localized analysis of cloud optical depth and droplet radius from MODIS observations. In *Asia Oceania Geosciences Society 12th Annual Meeting, Singapore*, 2015. Oral presentation given by J. Leinonen.
- [21] J. Leinonen, M. D. Lebsack, S. Tanelli, K. Suzuki, H. Yashiro, and Y. Miyamoto. Spaceborne precipitation radar simulation from a global cloud-resolving model. In *2014 American Geophysical Union Fall Meeting, San Francisco, California, USA*, 2014. Poster presentation.
- [20] J. Leinonen, M. D. Lebsack, K. Suzuki, H. Yashiro, and Y. Miyamoto. CloudSat observations simulated from a global cloud system-resolving model. In *2014 CloudSat Science Team Meeting, Alexandria, Virginia, USA*, 2014. Poster presentation.
- [19] S. Collis, J. Helmus, J. Leinonen, S. Giangrande, V. P. Ghate, C. Sivaraman, K. Gaustad, N. Bharadwaj, J. Monroe, and B. Ermold. Data fusion in remote sensing in the ARM program using Python. In *Fourth Symposium on Advances in Modeling and Analysis Using Python, American Meteorological Society Annual Meeting, Phoenix, Arizona, USA*, 2014. Oral presentation given by S. Collis.
- [18] J. Leinonen, D. Moisseev, and T. Nousiainen. Linking snowflake microphysics and radar scattering models. In *URSI Commission F Specialist Symposium on Microwave Remote Sensing of the Earth, Oceans, and Atmosphere, Espoo, Finland*, 2013. Oral presentation given by J. Leinonen.
- [17] J. Leinonen, J. Tyynelä, D. Moisseev, and T. Nousiainen. Linking snowflake microphysics and radar scattering models. In *Fourth International Workshop on Space-based Snowfall Measurement, Mammoth Mountain, California, USA*, 2013. Poster presentation.
- [16] J. Leinonen, D. Moisseev, J. Tyynelä, and T. Nousiainen. Non-spheroidal scattering effects in millimeter-wave measurements of snowfall. In *9th International Symposium on Tropospheric Profiling, L'Aquila, Italy*, 2012. Oral presentation given by D. Moisseev.
- [15] V. Chandrasekar, A.-M. Harri, S. Lautaportti, J. Leinonen, A. von Lerber, D. Moisseev, T. Nousiainen, J. Pulliainen, and J. Tyynelä. GPM activities in Finland. In *5th International Workshop for GPM Ground Validation, Toronto, Ontario, Canada*, 2012. Oral presentation given by J. Leinonen.
- [14] A. von Lerber, D. Moisseev, J. Leinonen, J. Koistinen, and M. Hallikainen. Estimation of attenuation in a low melting layer at 5.6 GHz according to snow type. In *ERAD 2012, Toulouse, France*, 2012. Poster presentation.
- [13] E. O'Connor, A. Hirsikko, P. Jokinen, D. Moisseev, and J. Leinonen. Hole-punch clouds over Helsinki, Finland. In *ERAD 2012, Toulouse, France*, 2012. Poster presentation.

- [12] S. Kneifel, R. Bennartz, M. S. Kulie, J. Leinonen, D. Moisseev, T. Nousiainen, and J. Tyynelä. A triple frequency approach to retrieve microphysical snowfall parameters. In *ERAD 2012, Toulouse, France*, 2012. Oral presentation given by S. Kneifel.
- [11] J. Leinonen, D. Moisseev, T. Nousiainen, and J. Tyynelä. Statistical parametrization of the backscattering properties of snowflakes. In *ERAD 2012, Toulouse, France*, 2012. Oral presentation given by J. Leinonen.
- [10] J. Leinonen, J. Tyynelä, D. Moisseev, and T. Nousiainen. Identification of non-spheroidal scattering effects from snowfall simulations and observations. In *Third International Workshop on Space-based Snowfall Measurement, Grainau, Germany*, 2011. Poster presentation.
- [9] J. Leinonen, D. Moisseev, V. Chandrasekar, and J. Koskinen. Simulation of Ku/Ka band radar observations of ice precipitation by combining C-band weather radar and CloudSat CPR measurements. In *International Geoscience & Remote Sensing Symposium 2010, Honolulu, USA*, 2010. Poster presentation.
- [8] J. Tyynelä, J. Leinonen, T. Nousiainen, and D. Moisseev. Modeling radar backscattering from melting snowflakes at C-band using DDA and TMM. In *12th Electromagnetic and Light Scattering Conference, Helsinki, Finland*, 2010. Poster presentation.
- [7] J. Leinonen and D. Moisseev. DPR simulations using multi-parameter radar data. In *The 4th GPM International GV Workshop, Helsinki, Finland*, 2010. Oral presentation given by J. Leinonen.
- [6] H. Haukka, J. Polkko, A.M. Harri, W. Schmidt, J. Leinonen, M. Genzer, and T. Mäkinen. MetBaro — pressure instrument for Mars MetNet lander. In *EGU 2010, Vienna, Austria*, 2010. Poster presentation.
- [5] M. Genzer, J. Polkko, A.M. Harri, W. Schmidt, J. Leinonen, T. Mäkinen, and H. Haukka. MetHumi — humidity device for Mars MetNet lander. In *EGU 2010, Vienna, Austria*, 2010. Poster presentation.
- [4] J. Leinonen, D. Moisseev, V. Chandrasekar, and J. Koskinen. Simulating GPM DPR snowfall observations by using combined weather radar and CloudSat measurements. In *Nordic Remote Sensing Days, Helsinki, Finland*, 2009. Oral presentation given by J. Leinonen.
- [3] J. Leinonen, T. Mäkinen, and A.-M. Harri. Pressure-based determination of Titan's temperature profile using the Huygens HASI/PPI instrument. In *36th COSPAR Scientific Assembly, Beijing, China*, 2006. Poster presentation.
- [2] J. Leinonen, T. Mäkinen, and A.-M. Harri. The atmospheric temperature profile of Titan reconstructed from pressure data. In *4th International Planetary Probe Workshop, Pasadena, California, USA*, 2006. Poster presentation.
- [1] J. T. T. Mäkinen, A.-M. Harri, T. Siili, A. Lehto, H. Kahanpää, M. Genzer, G. W. Leppelmeier, and J. Leinonen. PPI/HASI pressure measurements in the atmosphere of Titan. In *American Astronomical Society, DPS meeting #37*, 2005. Poster presentation.